REMARKS

Claims 1-133 are pending in this application. By this amendment, Applicants have added claims 13-133 to replace previously submitted claims 26-149. The applicants respectfully submit that claims 13-133 do not contain new matter, and that the present invention, as defined by claims 1-133, is patentable over the prior art.

The applicants believe that the amendment to the drawings complies with the requirements set forth in 37 CFR 1.173. No new matter has been added.

The Examiner asserts that the reissue oath/declaration filed with the application is defective because it fails to identify at least one error which is relied upon to support the reissue application. Claims 1-12 and 26-149 are rejected as being based upon a defective reissue declaration under 35 U.S.C. 251. The Examiner also asserts that the application is objected to under 37 CFR 1.172 as lacking the written consent of all assignees owning an undivided interest in the patent. Claims 56-149 are rejected as being improperly broadened under 25 U.S.C. 251. The Examiner asserts that Claims 52-53 are rejected under 35 U.S.C. 112, Second Paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner further asserts that Claims 26, 35, 39-40, 46, 52-53, 56-119, 121, 126, 133, and 135-149 are rejected under 35 U.S.C. 112, First Paragraph as failing to comply with the written description requirement.

As stated above, the applicants have added claims 13-133 so as to overcome the 35 U.S.C. 112, First and Second Paragraph rejections. In addition, applicants submit herewith an executed reissue oath/declaration, and consent of the assignees together with an amendment to the claims of the Reissue application. The applicants respectfully submit that the Reissue Application is in condition for allowance and action to that end is respectfully requested.

I. THE 35 U.S.C. §102 AND §103 REJECTIONS

The Examiner asserts that claims 1-12, 26, 30-46, 48, 51-52, 56-58, 62, 64-71, 73-79, 81, 84-85, 89-104, 106-118, 120-133, and 135-148 are rejected under 35 U.S.C. §102(b) as being anticipated by Vestal, U.S. Patent No. 5,160,840 (hereinafter "Vestal"). The Examiner also asserts that claims 27-29, 47, 49-50, 53-55, 59-61, 63, 72, 80, 82-83, 86-88, 105, 119, 134, and 149 are rejected under 35 U.S.C. §103(a) as being unpatentable over Vestal, in view of Official Notice.. The Applicants respectfully traverse the Examiner's rejections, and assert that Vestal, and Official Notice alone or in combination, does not teach, suggest, or render obvious all of the limitations as required in claims 1-133.

As noted above, Applicants have added independent claims 43, 76, 77, 92, 105, 119, and 133 and dependent claims 13-42, 44-75, 78-91, 93-104, 106-118, and 120-132 so as to more clearly distinguish the present invention, as defined by such claims, over the prior art. Applicant therefore respectfully submits that the present invention, as claimed in claims 13-133, is patentable over the known prior art.

Referring initially to independent claim 1, Vestal does not teach, among other things, the present principles, in one embodiment, which are applicable to a method comprising "establishing a non-zero field within the first region of the spectrometer", "generating ions from the sample source within the first region", "establishing an ion accelerating field within the first region after establishing said non-zero field therein, said ion accelerating field accelerating said ions generated within the first region toward the ion detector", and "detecting said accelerated ions at the ion detector and determining therefrom mass to charge ratios of said accelerated

ions.", all of which are specifically recited features of independent claim 1. Further, Official Notice also fails to teach these features

Applicants' invention, as disclosed in the specification of Patent 5,712,479, is an apparatus and method for minimizing ion peak width measurements in a time-of-flight mass spectrometer to thereby minimize the effects of initial ion position distributions and initial ion velocity distributions on the mass resolution of the spectrometer (Abstract). Also, instrument parameters are optimized to achieve minimization of ion peak width broadening through ion source and ion generation geometries. (Abstract). Vestal, and Official Notice merely disclose a time-of-flight mass spectrometry and method of operating a TOF mass spectrometer, including one or more electrically charged accelerating plates for accelerating ions, a reflector, a first ion drift region upstream from the reflector, a second ion drift region downstream from the deflector, and an ion detector. (Vestal, Abstract). The ion reflector includes a primary reflecting field for decelerating ions and reflecting low energy ions, and a second reflecting field for reflecting high-energy ions and for establishing a substantially uniform ion flight time through the one or more accelerating fields and reflecting fields. (Vestal, Abstract). Further, the length of the ion drift regions may be adjusted such that ion travel time through these regions is equal to the ion travel time through the accelerating and reflecting fields. (Vestal, Abstract).

More importantly, Vestal and Official Notice do not disclose "establishing a non-zero field within the first region of the spectrometer", "generating ions from the sample source within the first region", "establishing an ion accelerating field within the first region after establishing said non-zero field therein, said ion accelerating field accelerating said ions generated within the first region toward the ion detector", and "detecting said accelerated ions at the ion detector and determining therefrom mass to charge ratios of said accelerated ions." In light of the comments

above, the Applicants submit that claim 1 is not anticipated by Vestal and Official Notice.

Further, as claims 2-42 depend either directly or indirectly from independent claim 1, they contain all of the elements and limitations as independent claim 1 from which they depend. Claims 2-42 are therefore, patentable over Vestal and Official Notice for at least the same reasons as independent claim 1. The Applicants respectfully request that the Examiner withdraw the 35 U.S.C. § 103 rejection of claims 1-42.

Referring next to independent claim 43, Applicants respectfully submit that the limitations of claim 43 are analogous to those discussed above for claim 1. As described above regarding claim 1, Vestal does not teach among other things, the present principles, in one embodiment, which are applicable to a time of flight spectrometer comprising "a first region including sample source disposed therein", "an ion deflector remote from the first region", "an ion detector remote from said ion deflector", "means for establishing a first field within said first region", "means for generating ions from said sample source", "means for establishing a second field within said first region at a predetermined time after establishing said first field", "means for energizing said ion deflector", "wherein said second field accelerates said ions generated within said first region towards said deflector", "wherein said deflector reflects said ions toward said detector." Further, Official Notice also fails to teach these features

Applicants' invention, as disclosed in the specification of Patent 5,712,479, is an apparatus and method for minimizing ion peak width measurements in a time-of-flight mass spectrometer to thereby minimize the effects of initial ion position distributions and initial ion velocity distributions on the mass resolution of the spectrometer (Abstract). Also, instrument parameters are optimized to achieve minimization of ion peak width broadening through ion source and ion generation geometries. (Abstract).

Vestal, and Official Notice merely disclose a time-of-flight mass spectrometry and method of operating a TOF mass spectrometer, including one or more electrically charged accelerating plates for accelerating ions, a reflector, a first ion drift region upstream from the reflector, a second ion drift region downstream from the deflector, and an ion detector. (Vestal, Abstract). The ion reflector includes a primary reflecting field for decelerating ions and reflecting low energy ions, and a second reflecting field for reflecting high-energy ions and for establishing a substantially uniform ion flight time through the one or more accelerating fields and reflecting fields. (Vestal, Abstract). Further, the length of the ion drift regions may be adjusted such that ion travel time through these regions is equal to the ion travel time through the accelerating and reflecting fields. (Vestal, Abstract).

More importantly, Vestal and Official Notice do not disclose "a first region including sample source disposed therein", "an ion deflector remote from the first region", "an ion detector remote from said ion deflector", "means for establishing a first field within said first region", "means for generating ions from said sample source", "means for establishing a second field within said first region at a predetermined time after establishing said first field", "means for energizing said ion deflector", "wherein said second field accelerates said ions generated within said first region towards said deflector", "wherein said deflector reflects said ions toward said detector." In light of the comments above, the Applicants submit that claim 43 is patentable over Vestal and Official Notice.

Further, as claims 44-75 depend either directly or indirectly from independent claim 43, they contain all of the elements and limitations as independent claim 43 from which they depend. Claims 44-75 are therefore, patentable over Vestal and Official Notice for at least the same

reasons as independent claim 43. The Applicants respectfully request that the Examiner withdraw the 35 U.S.C. § 103 rejection of claims 44-75.

Referring next to independent claim 76, Applicants respectfully submit that Vestal does not teach among other things, the present principles, in one embodiment, which are applicable to a method comprising "applying a first potential to a sample holder", "applying a second potential to a first element spaced apart from the sample holder, wherein said sample holder and said first element defining a first region and wherein said first and second potentials define a first electric field in said first region", "ionizing a sample proximately disposed to the holder to form sample ions", "energizing an ion deflector spaced apart from the first element", "applying a voltage pulser for changing the potential difference between the sample holder and the first element at a predetermined time which defines a second electric field between the sample holder and the first element to accelerate said ions from said first region toward said deflector", and "wherein the first and second electric fields and the predetermined time are chosen such that a flight time of said ions from said first region toward said deflector have a mass-to-charge ratio that is independent to second order of initial velocity." Further, Official Notice also fails to teach these features

Applicants' invention, as disclosed in the specification of Patent 5,712,479, is an apparatus and method for minimizing ion peak width measurements in a time-of-flight mass spectrometer to thereby minimize the effects of initial ion position distributions and initial ion velocity distributions on the mass resolution of the spectrometer (Abstract). Also, instrument parameters are optimized to achieve minimization of ion peak width broadening through ion source and ion generation geometries. (Abstract).

Vestal, and Official Notice merely disclose a time-of-flight mass spectrometry and method of operating a TOF mass spectrometer, including one or more electrically charged accelerating plates for accelerating ions, a reflector, a first ion drift region upstream from the reflector, a second ion drift region downstream from the deflector, and an ion detector. (Vestal, Abstract). The ion reflector includes a primary reflecting field for decelerating ions and reflecting low energy ions, and a second reflecting field for reflecting high-energy ions and for establishing a substantially uniform ion flight time through the one or more accelerating fields and reflecting fields. (Vestal, Abstract). Further, the length of the ion drift regions may be adjusted such that ion travel time through these regions is equal to the ion travel time through the accelerating and reflecting fields. (Vestal, Abstract).

More importantly, Vestal and Official Notice do not disclose "energizing an ion deflector spaced apart from the first element", "applying a voltage pulser for changing the potential difference between the sample holder and the first element at a predetermined time which defines a second electric field between the sample holder and the first element to accelerate said ions from said first region toward said deflector", and "wherein the first and second electric fields and the predetermined time are chosen such that a flight time of said ions from said first region toward said deflector have a mass-to-charge ratio that is independent to second order of initial velocity" In light of the comments above, the Applicants submit that claim 76 is patentable over Vestal and Official Notice.

Referring next to independent claim 77, Applicants respectfully submit that Vestal does not teach among other things, the present principles, in one embodiment, which are applicable to a TOFMS comprising "a source region including a sample holder and at least one electrode disposed therein", "means for generating ions from said sample holder", "an ion deflector, said

deflector being energized", "means for accelerating said ions orthogonally from said source region into a drift region of said TOFMS toward said ion deflector", "an ion detector remote from said ion deflector for detecting said accelerated ions such that mass to charge ratios may be determined", "wherein a first potential is applied to said sample holder to accelerate said ions towards said means for accelerating", "wherein said deflector reflects said ions toward said detector", and "wherein the time spread in the time of flight of ions of a predetermined mass to charge ratio generated within said source region to the means for detecting is minimized." Further, Official Notice also fails to teach these features

Applicants' invention, as disclosed in the specification of Patent 5,712,479, is an apparatus and method for minimizing ion peak width measurements in a time-of-flight mass spectrometer to thereby minimize the effects of initial ion position distributions and initial ion velocity distributions on the mass resolution of the spectrometer (Abstract). In addition, instrument parameters are optimized to achieve minimization of ion peak width broadening through ion source and ion generation geometries. (Abstract).

Vestal, and Official Notice merely disclose a time-of-flight mass spectrometry and method of operating a TOF mass spectrometer, including one or more electrically charged accelerating plates for accelerating ions, a reflector, a first ion drift region upstream from the reflector, a second ion drift region downstream from the deflector, and an ion detector. (Vestal, Abstract). The ion reflector includes a primary reflecting field for decelerating ions and reflecting low energy ions, and a second reflecting field for reflecting high-energy ions and for establishing a substantially uniform ion flight time through the one or more accelerating fields and reflecting fields. (Vestal, Abstract). Further, the length of the ion drift regions may be

adjusted such that ion travel time through these regions is equal to the ion travel time through the accelerating and reflecting fields. (Vestal, Abstract).

More importantly, Vestal and Official Notice do not disclose "means for accelerating said ions orthogonally from said source region into a drift region of said TOFMS toward said ion deflector", "an ion detector remote from said ion deflector for detecting said accelerated ions such that mass to charge ratios may be determined", "wherein a first potential is applied to said sample holder to accelerate said ions towards said means for accelerating", "wherein said deflector reflects said ions toward said detector", and "wherein the time spread in the time of flight of ions of a predetermined mass to charge ratio generated within said source region to the means for detecting is minimized." In light of the comments above, the Applicants submit that claim 77 is patentable over Vestal and Official Notice.

Further, as claims 78-91 depend either directly or indirectly from independent claim 77, they contain all of the elements and limitations as independent claim 77 from which they depend. Claims 78-91 are therefore, patentable over Vestal and Official Notice for at least the same reasons as independent claim 77. The Applicants respectfully request that the Examiner withdraw the 35 U.S.C. § 103 rejection of claims 78-91.

Referring next to independent claim 92, Applicants respectfully submit that the limitations of claim 92 are analogous to those discussed above for claim 77. As described above regarding claim 1, Vestal does not teach among other things, the present principles, in one embodiment, which are applicable to a method comprising, among other things, "establishing a first electric field in a source region that includes a sample holder", "ionizing a sample proximately disposed to said sample holder to form sample ions", "establishing a second electric field in an accelerating region", "energizing an ion deflector spaced apart from the first element",

"detecting said sample ions at an ion detector such that mass to charge ratios of said sample ions may be determined", "wherein said first electric field accelerates said sample ions from said sample holder toward said accelerating region", "wherein said second electric field accelerates said sample ions from said sample holder toward said deflector", and "wherein the time spread in the time of flight of said sample ions of a predetermined mass to charge ratio generated within said source region to said ion detector is minimized." Further, Official Notice also fails to teach these features

Vestal, and Official Notice merely disclose a time-of-flight mass spectrometry and method of operating a TOF mass spectrometer, including one or more electrically charged accelerating plates for accelerating ions, a reflector, a first ion drift region upstream from the reflector, a second ion drift region downstream from the deflector, and an ion detector. (Vestal, Abstract). The ion reflector includes a primary reflecting field for decelerating ions and reflecting low energy ions, and a second reflecting field for reflecting high-energy ions and for establishing a substantially uniform ion flight time through the one or more accelerating fields and reflecting fields. (Vestal, Abstract). Further, the length of the ion drift regions may be adjusted such that ion travel time through these regions is equal to the ion travel time through the accelerating and reflecting fields. (Vestal, Abstract). In light of the comments above, the Applicants submit that claim 92 is patentable over Vestal and Official Notice.

Further, as claims 93-104 depend either directly or indirectly from independent claim 92, they contain all of the elements and limitations as independent claim 92 from which they depend. Claims 93-104 are therefore, patentable over Vestal and Official Notice for at least the same reasons as independent claim 92. The Applicants respectfully request that the Examiner withdraw the 35 U.S.C. § 103 rejection of claims 93-104.

Referring next to independent claim 105, Applicants respectfully submit that the limitations of claim 105 are analogous to those discussed above for claim 1. As described above regarding claim 1, Vestal does not teach among other things, the present principles, in one embodiment, which are applicable to a method comprising, among other things, "generating ions from a sample source within the first region", "establishing an ion accelerating field within the flight tube region, said ion accelerating field accelerating said ions generated within the first region toward the ion detector", and "detecting said accelerated ions at the ion detector and determining the mass to charge ratios of said accelerated ions." Further, Official Notice also fails to teach these features

Further, as claims 106-118 depend either directly or indirectly from independent claim 105, they contain all of the elements and limitations as independent claim 105 from which they depend. Claims 106-118 are therefore, patentable over Vestal and Official Notice for at least the same reasons as independent claim 105.

Referring next to independent claim 119, Applicants respectfully submit that the limitations of claim 119 are analogous to those discussed above for claim 1. As described above regarding claim 1, Vestal does not teach among other things, the present principles, in one embodiment, which are applicable to a method comprising, among other things, "establishing a non-zero field within the source region", "generating ions from the sample source within the source region", "establishing an ion accelerating field within the analyzer region after establishing said non-zero field in the source region, said ion accelerating field orthogonally accelerating said ions generated within said source region in a path leading to the ion detector", and "detecting said accelerated ions at the ion detector and determining therefrom mass to charge ratios of said accelerated ions." Further, Official Notice also fails to teach these features

Further, as claims 120-132 depend either directly or indirectly from independent claim 119, they contain all of the elements and limitations as independent claim 119 from which they depend. Claims 120-132 are therefore, patentable over Vestal and Official Notice for at least the same reasons as independent claim 119.

Referring lastly to independent claim 133, Applicants respectfully submit that the limitations of claim 133 are analogous to those discussed above for claim 76. As described above regarding claim 76, Vestal does not teach among other things, the present principles, in one embodiment, which are applicable to a method comprising, among other things, "a) applying a potential to a sample holder", "b) applying a potential to a first element spaced apart from the sample holder which, together with the potential on the sample holder defines a first electric field between the sample holder and the first element", "c) ionizing a sample proximately disposed to the holder to form sample ions", "d) applying a second potential to either the sample holder or the first element at a predetermined time subsequent to steps a) through c) which together with the potential on the first element, defines a second electric field between the sample holder and the first element, and which extracts the ions from the first element after the predetermined time", "e) energizing an ion reflector spaced apart from the first element", and "wherein the first and second electric fields and the predetermined time are chosen such that a flight time of the extracted ions of like mass-to-charge ratio from the reflector to a detector will be independent to second order of the initial velocity." Further, Official Notice also fails to teach these features

Vestal, and Official Notice merely disclose a time-of-flight mass spectrometry and method of operating a TOF mass spectrometer, including one or more electrically charged accelerating plates for accelerating ions, a reflector, a first ion drift region upstream from the reflector, a second ion drift region downstream from the deflector, and an ion detector. (Vestal,

Abstract). The ion reflector includes a primary reflecting field for decelerating ions and reflecting low energy ions, and a second reflecting field for reflecting high-energy ions and for establishing a substantially uniform ion flight time through the one or more accelerating fields and reflecting fields. (Vestal, Abstract). Further, the length of the ion drift regions may be adjusted such that ion travel time through these regions is equal to the ion travel time through the accelerating and reflecting fields. (Vestal, Abstract). In light of the comments above, the Applicants submit that claim 133 is patentable over Vestal and Official Notice.

II. CONCLUSION

In view of the foregoing, the application is deemed to be in condition for allowance and action to that end is respectfully requested. Allowance of pending claims 1-133 is, therefore, respectfully requested.

Should any changes to the claims and/or specification be deemed necessary to place the application in condition for allowance, the Examiner is respectfully requested to contact the undersigned attorney to discuss the same.

Respectfully Submitted,

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